

**ABSTRACT**

**[0038]** A method of epoxidizing an unsaturated compound having a carbon-to-carbon double bond to form an oxirane ring across the double bond comprising adding to said unsaturated compound (a) an organic acid capable of being oxidized to form a peracid; (b) an oxidizing agent selected from hydrogen peroxide or acetaldehyde monoperoxide, or a combination thereof; and (c) with or without an acid catalyst selected from a mineral acid or styrene sulfonic acid, or a combination thereof to form a reactant mixture; and forming the reactant mixture in a film against a wall of a thin-film reactor that is at a temperature sufficient to form a peracid from the organic acid, and contacting the film of reactant mixture against the film reactor wall for a time sufficient for reaction of a portion of the peracid with the unsaturated compound to form an oxirane ring across a double bond of the unsaturated compound. In another embodiment, preformed peracid and unsaturated compound are added directly to the thin-film reactor.